Large-Scale Manufacturing of Bulk Metallic Glass Sheets and Fiber Metal Laminates, Phase I

Completed Technology Project (2014 - 2014)

Project Introduction

Liquidmetal Technologies (LMT) and the University of Southern California (USC)'s M.C. Gill Composites Center team up to develop manufacturing processes for large-scale bulk metallic glass (BMG) and fiber laminate systems for aerospace applications. The proposed innovation consists of the development of a process to manufacture thin BMG sheets (150mm x 300mm x 0.1-1mm) by tube casting and hot rolling along with a process to fabricate fiber metal laminates (FMLs) utilizing the BMG sheets thereof and carbon fiber prepregs. While Phase I would focus on development of a small-scale prototype, the completed Phase I work would also give insight into the feasibility of large-scale manufacturing processes, such as vertical continuous casting, flash processing, autoclave moulding, out-of-autoclave moulding, and press moulding, many of which would be explored in a potential Phase II effort. Thus, in Phase I the technology readiness level (TRL) of the proposed innovation would increase from 2 to 3, and in Phase II the TRL would increase from 3 to 5.

Primary U.S. Work Locations and Key Partners

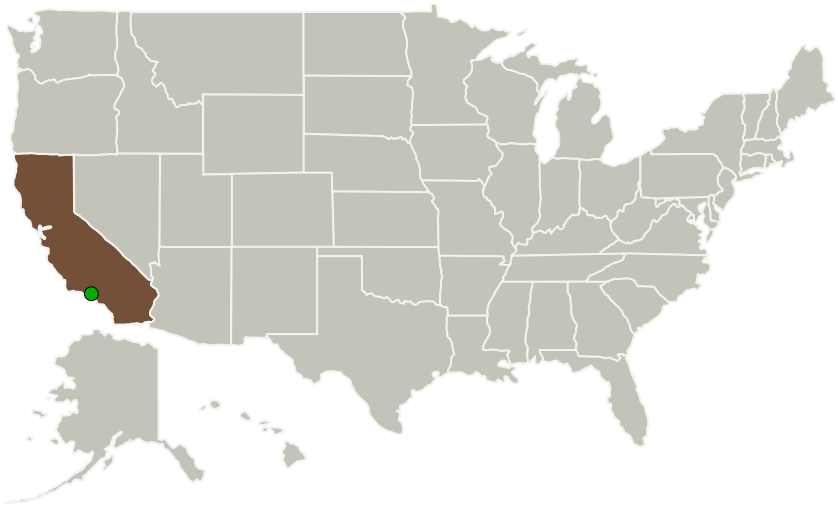


Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Liquidmetal Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Continued on following page.

Large-Scale Manufacturing of Bulk Metallic Glass Sheets and Fiber Metal Laminates, Phase I

Completed Technology Project (2014 - 2014)

Organizations Performing Work	Role	Type	Location
Liquidmetal Technologies, Inc.	Lead Organization	Industry	Rancho Santa Margarita, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137767)*

Images

Project Image

Large-Scale Manufacturing of Bulk Metallic Glass Sheets and Fiber Metal Laminates Project Image *(https://techport.nasa.gov/image/134234)*

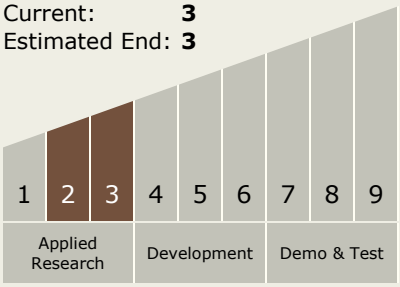
Project Management *(cont.)*

Principal Investigator:

Stephanie Okeeffe

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System